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ABSTRACT

This paper explores what has been reported by several researchers in an attempt to make recommendations on the most effective method of introducing basketball to elementary school age children. Based on this review the following observations are brought forward for consideration. Factors which significantly affected student success include: height of basket, proper instruction, leg power, grip strength, height of females, and the use of a mastery learning strategy. Factors which did not significantly affect success include size of ball and height of males. (Author)

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Application of Research to the Teaching of Basketball at the Elementary School Level

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Application of Research to the Teaching of

Basketball at the Elementary School Level

Abstract

This paper explores what has been reported by several researchers in an attempt to make recommendations as to the most effective method of introducing basketball to elementary school age children. Based on this review the following observations are brought forward for consideration. Factors which significantly effected student success include: height of basket, proper instruction, leg power, grip strength, height of females, and the use of a mastery learning strategy. Factors which did not significantly effect success include size of ball and height of males.

Application of Research to the Teaching of Basketball at the Elementary School Level

Researchers over the past many years have been attempting to determine which factors have an effect on children's ability to play basketball. Is it related to physical factors such as height, strength or power of the children? Is it related to the size of ball or the height of the basket the children use to practice their skills? Or is it related to the teaching strategies used by teachers? This paper will explore what has been reported by several researchers in an attempt to make recommendations as to the most effective method of introducing basketball to elementary school age children.

Haywood (1978) conducted a study to determine the effect of regulation and junior-sized basketballs on children's ability to perform on a speed pass test and a front shot test. The children in this study were between the ages of 9.0 and 12.7 years. He concluded;

1) Speed pass scores improved with age and experience;
2) Subjects in each age group did better on the speed pass test with the junior-sized basketball;
3) Subjects (9-10.5) performed better on the front shot test with the junior basketball while the older children performed better with the regulation basketball;
4) Boys scored higher than girls on the front shot test.

Zankovich and Husak (1983) studied the effect of ball size on the performance of grade 5 and 6 children as they performed a free throw test, a speed pass test and a ball handling test. Even though the children only practiced with the smaller ball throughout the season, there was no significant difference between their scores when using a

small ball or regulation ball. Hence it could not be concluded that performances were better when the smaller ball was used.

Stinar (1981) tested groups of fifth and sixth grade boys and girls on their shooting performance using a smaller ball (28 1/2") and a regulation ball while performing the under the basket shot and the foul shot at baskets 8' and 10' from the floor. Results indicated that all groups of subjects improved their performance but no significant difference between test conditions was noted.

It was reported by Benham (1986) that a study by Isaacs and Karpman (1981) designed to investigate the effect of various basketballs (size and weight) and basket heights on the shooting accuracy of very young subjects (x age = 8.5 years) found that the odds of hitting the rim or making the shot were greatly enhanced when an 8' basket was used instead of a regular 10' basket. There was no indication as to the role that the various balls played.

Benham (1986) following a review of literature on the effects of modified basketball size and goal (basket) height on children's performance concluded:

1) a decrease in the basketball size and weight appears to benefit young children with less absolute body size and strength by requiring less force to be applied when shooting or passing and improved ball control skills;
2) a decrease in the goal (basket) height appears to benefit children's shooting accuracy. Unfortunately, the researcher failed to report on three substantive studies done by Miller (1971), Turkington (1985) and Turkington (1987).

Miller (1971) studied the effect of ball size and basket height on the learning of selected basketball skills by fifth grade boys. In particular, he evaluated student performance using a speed pass test, a dribbling test, an under the basket shot test and a foul shot test. Students were assigned for practice to a group using a particular ball size and basket height. Under regulation test conditions (ie. Big ball and high basket) he found;

1) Practice ball size did not make a significant difference in the student's ability to perform well on the speed pass or dribbling tests;
2) Practicing with a small ball was more effective than practicing with a large ball when the under the basket shot was tested under regulation conditions;
3) Practicing at a high basket or low basket did not have any significant effect on test results under regulation conditions.

The students were also tested under practice conditions to see if any significant improvement occurred.

1) Both groups (ie. small ball, big ball) showed significant improvement on the speed pass and dribbling tests;
2) Results on the shooting tests were not conclusive but did indicate:
   a) Group which practiced with big ball and <u>low basket</u> showed significant improvement in both the under the basket and foul shot tests;

b) Group which practiced with big ball and high basket failed to show significant improvement in both the under the basket and foul shot tests;

c) Group which practiced with small ball low basket showed significant improvement on the under the basket test but did not improve significantly on the foul shot test;

d) Group which practiced with small ball high basket did show significant improvement on the foul shot test but not on the under the basket test.

Turkington (1985) studied the effect of ball size (6 and 7) and basket height (8' - 9' - 10') on the ability of elementary school children to acquire the layup skill in basketball. This comprehensive study involved both male and female subjects from grade 4 through grade 7 (ie. 8-12 years of age). The subjects (N = 412) were divided by sex, grade, practice ball size and practice basket height into various training groups following a pretest. All subjects participated in six structured instructional lessons which stressed the layup but also included instruction in ball handling, passing, and dribbling. During the pretest and posttest segments of this study, all subjects shot 10 shots with a size 6 basketball, 10 shots with a size 7 ball at 8', 9' and 10' baskets. The following results were noted:

1) Effect of practice ball size

There was no significant difference between the performance of those who practiced with a size 6 ball and those who practiced with a size 7 ball under most of the test conditions (see Table 1).

2) Effect of practice basket height on improvement

Overall - a comparison of pretest and posttest scores indicated a significant improvement in total test scores (ie. 60 shots) by 23 of the 24 groups (see Table 2).

Grade 4 - Although five of the six groups showed a significant improvement, the overall performance was of a low quality and the value of introducing the layup to grade 4 students is questioned (see Table 2).

Grades 5-7 - All groups showed a significant improvement in performance (see Table 2).

3) Effect of practice height on shooting performance

A comparison of posttest scores among those students who practiced at 8', 9' and 10' revealed very little significant difference under most test conditions. Based on these results, it appears that practice height is not a significant factor in determining shooting success (see Table 3).

4) Effect of ball size on shooting performance

There was no significant difference between the scores recorded using a size 6 or size 7 ball at 8', 9' or 10' (see Table 4). Hence, either a size 6 or size 7 ball could be used with equal success.

5) Effect of basket height on shooting performance

Males

Grade 4 and 5 - Subjects scored significantly better at 8' over 9', 8' over 10' and 9' over 10' (see Table 5).

Grade 6 and 7 - Subjects scored significantly better when shooting at an 8' basket over a 10' basket and a 9' basket over a 10' basket. They scored similarly at 8' and 9' baskets (see Table 5).

Females

Grade 4 and 5 - Subjects scored significantly better when shooting at an 8' basket over a 10' basket and 9' basket over 10' basket. Subjects scored similarly at 8' and 9' baskets (see Table 6).

Grade 6 and 7 - Subjects in grade 6 scored similarly at 8', 9' and 10' baskets while the grade 7 subjects scored significantly better at 8' baskets over 10' baskets and similarly at 8' and 9' baskets (see Table 6).

Based on the above information, it is recommended that the following basket heights be used.

	Grade			
	4	5	6	7
Males	8'	8'	8 or 9'	9'
Females	8'	8'	8 or 9'	9'

In an attempt to determine the effect that the subjects' height, jump reach and grip strength may have on their ability to score layups, correlations were drawn with the following results.

6) Effect of subjects' height

Males - There was no significant correlation between the height of subjects and their shooting performance under 26 of the 28 test conditions. Hence subjects' height was not correlated with success (see Table 7).

Females - Although not conclusive, positive significant correlations did exist under several test conditions. This was evident with grade 7 females shooting at 8', 9' and 10' baskets and at the grade 4 level when subjects were shooting at 9' and 10' baskets (see Table 7). It appears that the height of female subjects may be a factor in determining success.

7) Effect of leg power (jump reach)

There appears to be a direct correlation between leg power and the ability to score layups under most test conditions for both male and female subjects (see Table 8).

8) Effect of grip strength

Males and Females - There was no clear indication that there was a direct correlation between grip strength and shooting success but it is interesting to note that a positive significant correlation did exist when comparing total scores and grip strength in five of the eight grade level/sex categories (see Table 9).

9) Effect of subjects' sex

Male subjects achieved at a higher level than their female counterparts. In fact, the data tends to support the premise that female subjects trail their male classmates by approximately one year (see Table 10).

Turkington (1986) also studied the effect of ball size and basket height on the ability of grade 6 students to acquire selected basketball skills. Three items from AAHPERD Basketball Skills Test Manual (1984); Speed spot shooting (9 foot distance), Passing, and Control dribble were

used to determine the students' proficiency. Following a pretest on the above items, both male and female subjects were divided into four groups for practice (see Table 11). All subjects participated in eight 40 minute structured instructional lessons before being posttested. A close examination of the results revealed the following:

1) Effect of Treatment

Male subjects from both schools showed similar improvement on all test conditions (see Table 12).

Female subjects showed significant improvement on 11 of the 12 test conditions. It is interesting to note that female subjects using the size 7 ball actually outperformed those using a size 6 ball (Table 13).

2) Effect of ball size

Shooting - There was no significant difference on posttest scores between the performance of those subjects who used the size 6 or size 7 ball (see Table 14).

Dribbling - Again, no significant difference in performance (See Table 15).

Passing - Once again, no significant difference in performance (See Table 16).

3) Effect of basket height on shooting performance

Male Subjects - There was no significant difference at the ($p < .05$) in posttest performance when shooting a size 6 or size 7 ball at a 9' or a 10' foot basket. However, it should be noted that although the .05 level was not achieved p values of .059 and .061 give an indication that male subjects perform better at the 9 foot basket. Further, when the scores

achieved with size 6 and size 7 balls were combined and then compared at 9 and 10 feet, a significant difference in favour of the 9 foot basket was achieved (see Table 17).

Female - There was no significant difference in the scores recorded by females using a size 6 or 7 ball at 9 or 10 foot baskets (see Table 17). However, the female subjects did score slightly better at the 9 foot basket.

Based on the results of this study, it could be argued that ball size does not make a significant difference in the performance of grade 6 subjects while performing the three test items. However, serious consideration should be given to using the 9 foot basket at this grade level.

Schildroth and Turkington (1985), studied the comparative effectiveness of three instructional strategies upon grade 6 students' ability to learn the basketball layup. A total of 112 grade 6 students (10-12 years) from four elementary schools participated in this study. Students at each school were grouped and instructed using either a mastery, whole, or progressive part instructional strategy. The fourth group of students served as the control group.

The pre and posttest consisted of ten layups. During each trial the students were awarded points according to the following system.

1 pt. - jumping off correct foot

1 pt. - releasing ball with correct hand

1 pt. - rebounding the ball off backboard

2 pts. - scoring the layup

5 pts. - Total points per attempt

During the pre and posttest segments, mastery was achieved when the students scored 40 or more points (ie 80%). In each lesson, the students followed the above procedure but were tested on only 5 layups and hence mastery was achieved when the student recorded 20 or more points.

Treatment 1 - Mastery Learning Strategy

Stage one - one step layup - once mastered then

Stage two - two step layup - once mastered then

Stage three - dribble layup

Treatment 2 - Whole Learning Strategy

Students practiced the complete dribble layup during each practice session.

Treatment 3 - Progressive - Part Learning Strategy

Students practiced each of the three stages of the basketball layup on a two day instructional cycle.

1) Effect of Treatment

All three treatment groups showed significant improvement ($p < .01$) while the control group failed to improve significantly (Table 18).

When the posttest data were examined in relation to the level of proficiency attained, it revealed that the mastery treatment strategy may have been superior in that 14 additional students from this group achieved mastery. This was far more than the other groups (See Table 19).

SUMMARY

Several studies have been conducted in an attempt to determine those factors which may effect how elementary school age children (grades 4-7) acquire various basketball skills. Based on this review, the following recommendations and observations are brought forward for your consideration.

1) Children may use either a size 6 or size 7 basketball with equal success in performing layups, under the basket shots, foul shots, speed dribble, and pass.

2) Children should practice their shooting and play with baskets at the following heights.

	Grade			
	4	5	6	7
Males	8'*	8'	8 or 9'	9'
Females	8'*	8'	8 or 9'	9'

*if at all

3) Children will improve their test scores if proper instruction is given.

4) Male students' height was not a factor in their success at shooting layups.

5) Female students' height appears to have some effect on their success at shooting layups. Lower baskets for shorter girls.

6) Children's success in scoring layups may be affected by their leg power as measured by the jump reach test. Leg strengthening exercises may improve children's ability to score layups.

7) Children's success in scoring layups may be correlated with grip strength. Grip strength exercises may improve children's ability to score layups.

8) Male subjects on average will generally score higher than female subjects. The difference appears to be one year. More attention needs to be given to female students so that this discrepancy can be reduced.

9) The use of a mastery learning strategy appears to benefit children more than a progressive part learning strategy or whole learning strategy.

Finally, I believe that if the above suggestions are followed and teachers provide content specific feedback to students on a regular basis, all children will learn to enjoy playing the great game of basketball.

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Table 1

Effect of practice ball size on shooting performance

Test Conditions	Grade 4		Grade 5		Grade 6		Grade 7	
Males	Practice Size 6	Practice Size 7	Practice Size 6	Practice Size 7	Practice Size 6	Practice Size 7	Practice Size 6	Practice Size 7
H8B6	3.13	2.91	4.69	4.30	5.93	5.20	7.27*	5.75
H8B7	3.75	3.52	4.66	4.93	5.76	5.63	7.59	6.33
H9B6	2.83	2.78	3.84	4.10	5.52	4.77	7.18	6.33
H9B7	3.29	2.78	4.75	4.20	5.86	5.13	7.41	6.67
H10B6	2.54	2.13	3.44	3.97	5.31	4.27	6.77	5.38
H10B7	2.38	2.96	3.28	3.57	5.24	4.53	7.00	5.92
Total	17.79	17.09	24.66	25.07	33.69	29.53	43.23*	36.42
Female								
H8B6	2.27	2.30	3.15	3.10	3.14	3.35	5.66	5.19
H8B7	2.55	1.95	3.70	2.85	3.27	3.39	6.00	5.29
H9B6	2.32	3.15	3.00	3.20	3.32	3.13	5.34	5.32
H9B7	1.73	2.35	3.65*	2.50	2.95	3.52	5.38	5.10
H10B6	1.32	1.45	2.60	1.90	3.27	2.78	4.72	5.06
H10B7	1.27	1.60	2.85	1.85	3.59	3.17	5.10	4.77
Total	11.45	12.30	18.85	15.15	19.55	19.35	32.21	30.74

*$p < .05$

Number of shots per test condition = 10

Table 2

Effect of practice basket height on improvement

	Practice basket height					
	8'		9'		10'	
	Pre	Post	Pre	Post	Pre	Post
Male						
Grade 4	13.59	15.29	12.27	18.60**	11.73	18.73**
Grade 5	12.44	28.00**	16.55	21.75**	17.23	25.31**
Grade 6	16.61	32.94**	13.57	27.83**	28.11	35.00**
Grade 7	28.00	34.33**	29.21	40.50**	34.15	42.30**
Female						
Grade 4	6.50	10.75**	7.71	13.65**	5.38	10.54*
Grade 5	9.08	18.58**	13.83	18.58*	8.13	14.63**
Grade 6	7.00	16.46**	10.53	19.18**	14.07	22.33**
Grade 7	15.38	34.00**	19.63	31.37**	23.47	29.18**

Number of shots per group = 60

* $p < .05$

** $p < .01$

Table 3

Effect of practice basket height on posttest shooting performance

	Grade 4			Grade 5			Grade 6			Grade 7		
	8'	9'	10'	8'	9'	10'	8'	9'	10'	8'	9'	10'
Males												
H8 B6	2.59	2.80	3.73	5.19	4.10	4.38	6.28	4.30*	6.44	5.42	6.14	7.35
H8 B7	3.18	4.00	3.80	5.19	5.45	4.04	6.11	4.78	6.44	6.08	6.86	7.50
H9 B6	3.06	2.53	2.80	4.19	3.00*	4.58	5.11	4.26*	6.28	6.58	6.79	6.80
H9 B7	2.47	3.20	3.53	5.13	3.35*	4.96	5.83	5.13	5.61	5.75	7.64	7.35
H10 B6	1.82	3.20	2.07	4.56	3.05	3.65	5.28	4.57	4.56	5.08	6.07	6.60
H10 B7	2.18	3.07	2.80	3.75	2.80	3.69	4.33	4.78	5.56	5.33	7.00	6.70
Total	15.29	18.60	18.73	28.00	21.75	25.31	32.94	27.83	35.00	34.33	40.50	42.30
Females												
H8 B6	2.17	1.88	2.92	3.08	4.25	2.31*	3.15	3.06	3.53	6.56	5.15	4.76*
H8 B7	1.67	2.76	2.15	3.08	3.67	3.13	2.38	3.53	3.93	5.63	5.81	5.35
H9 B6	3.17	3.18	1.69	3.33	3.08	2.94	2.54	3.12	3.93	5.69	5.44	4.82
H9 B7	2.17	2.53	1.23	3.42	4.00	2.13*	2.62	3.06	4.00	5.63	5.52	4.41
H10 B6	1.25	1.53	1.31	3.50	1.00*	2.25	3.00	2.82	3.27	5.38	4.56	5.00
H10 B7	1.17	1.76	1.23	2.42	2.75	2.00	2.77	3.59	3.67	5.13	4.89	4.82
Total	10.75	13.65	10.54	18.58	18.58	14.63	16.46	19.18	22.33	34.00	31.37	29.18

Number of shots per test condition = 10

* $p < .05$

Table 4

Effect of ball size on shooting performance

Males	Number of shots	Grade 4	Grade 5	Grade 6	Grade 7
Size 6	30	8.17	12.16	15.47	19.26
Size 7	30	9.34	12.69	16.07	20.39
Females					
Size 6	30	6.38	8.48	9.49	15.65
Size 7	30	5.71	8.70	9.96	15.80

Table 5

Effect of basket height on shooting performance - Males

		Grade 4	5	6	Grade 7
	N	47	62	59	46
8' Basket		6.6596*	9.2903*	11.2542	13.4130
9' Basket		5.8511	8.4516	10.6271	13.7609
8' Basket		6.6596**	9.2903**	11.2542**	13.4130*
10' Basket		5.0000	7.1129	9.6610	12.4783
9' Basket		5.8511*	8.4516**	10.6271*	13.7609**
10' Basket		5.0000	7.1129	9.6610	12.4783

*$p < .05$

**$p < .01$

Table 6

Effect of basket height on shooting performance - Females

	Grade 4	5	6	Grade 7
N	42	40	45	60
8' Basket	4.5476	6.4000	6.5778	11.0500
9' Basket	4.7381	6.1750	6.4667	10.5667
8' Basket	4.5476**	6.4000**	6.5778	11.0500*
10' Basket	2.8095	4.6000	6.4000	9.8333
9' Basket	4.7381**	6.1750**	6.4667	10.5667
10' Basket	2.8095	4.6000	6.4000	9.8333

*p < .05

**p < .01

Table 7

Correlations between subjects' height and ability to score layups

Grade	V02 H8B6	V04 H8B7	V06 H9B6	V08 H9B7	V10 H10B6	V12 H10B7	V14 Total
Males							
4	.397	.195	.416	.225	.395	.254	.449
5	.407	.393	.382	.439	.440	.452	.423
6	.329	.276	.035*	.433	.347	.325	.421
7	.238	.403	.054*	.474	.241	.218	.199
Females							
4	.225	.119	.006**	.099	.000**	.014**	.018*
5	.189	.466	.472	.265	.294	.073	.191
6	.077	.028*	.009**	.112	.146	.111	.011
7	.047*	.031*	.001*	.007**	.035*	.042*	.003**

* $p < .05$

** $p < .01$

Table 8

Correlations between subjects' leg power (jump reach) and ability to score layups

Grade	V02 H8B6	V04 H8B7	V06 H9B6	V08 H9B7	V10 H10B6	V12 H10B7	V14 Total
Males							
4	.093	.003**	.173	.278	.036*	.005**	.008**
5	.003**	.001**	.014**	.012**	.018*	.001**	.000**
6	.047*	.003**	.016*	.036*	.004**	.059	.005**
7	.000**	.003**	.022*	.033*	.000**	.089	.000**
Females							
4	.041*	.005**	.171	.013**	.012**	.000**	.000**
5	.059	.354	.340	.390	.068	.032*	.076
6	.002**	.023*	.002**	.157	.039*	.259	.003**
7	.009**	.001**	.002**	.025*	.004**	.009**	.000**

* $p < .05$

** $p < .01$

Table 9

Correlations between subjects' grip strength and ability to score layups

Grade	V02 H8B6	V04 H8B7	V06 H9B6	V08 H9B7	V10 H10B6	V12 H10B7	V14 Total
Males							
4	.118	.046*	.020*	.036*	.262	.218	.033*
5	.115	.103	.063	.437	.238	.100	.108
6	.021*	.036*	.095	.077	.028*	.050*	.020*
7	.06	.452	.095	.252	.029*	.250	.089
Females							
4	.151	.001**	.051**	.070	.000**	.002**	.000**
5	.261	.398	.148	.015*	.023**	.007**	.011**
6	.003**	.006**	.000**	.028*	.229	.165	.001**
7	.394	.005**	.226	.167	.363	.192	.113

* $p < .05$

** $p < .01$

Table 10

Comparison between male and female post-test mean scores

Grade	Male	Female
4	17.447 (8.722)	11.857 (7.233)
5	24.855 (10.887)	17.000 (6.540)
6	31.576 (12.871)	19.444 (7.677)
7	39.674 (10.713)	31.450 (10.992)

Table 11

Subjects by group

School	Basket Height	Number of Subjects			
		Size 6 ball		Size 7 ball	
		Male	Female	Male	Female
A	9'	12	17	12	18
B	10'	15	11	15	12
Total		27	28	27	30

Table 12

Effect of Treatment on Male Subjects

		School A - Basket Height 9 feet					
		Size 6 ball			Size 7 ball		
		Mean	S.D.	P	Mean	S.D.	P
Shooting	Pre	39.67	6.30	0.060	36.67	8.72	0.002
	Post	43.42	6.17		45.17	11.78	
Passing	Pre	75.67	8.37	0.004	70.50	10.66	0.001
	Post	8.116	7.78		77.42	10.66	
Dribbling	Pre	19.10	1.55	0.000	19.21	2.19	0.247
	Post	18.28	1.67		18.87	2.17	
		School B - Basket Height 10 feet					
Shooting	Pre	34.80	7.34	0.076	27.87	9.97	0.000
	Post	37.73	6.78		37.13	9.56	
Passing	Pre	77.60	7.82	0.105	70.87	10.96	0.007
	Post	80.47	10.18		75.47	10.60	
Dribbling	Pre	19.66	3.35	0.156	21.05	3.37	0.003
	Post	18.65	1.89		19.17	1.86	

Table 13

Effect of Treatment on Female Subjects

		School A - Basket Height 9 feet					
		Size 6 ball			Size 7 ball		
		Mean	S.D.	P	Mean	S.D.	P
Shooting	Pre	25.18	6.71	0.000	24.89	5.82	0.000
	Post	32.00	6.44		32.44	6.26	
Passing	Pre	63.47	6.54	0.000	64.22	7.07	0.000
	Post	72.12	10.09		72.94	7.80	
Dribbling	Pre	23.36	3.30	0.011	22.33	2.13	0.118
	Post	21.89	3.13		21.59	2.10	
		School B - Basket Height 10 feet					
Shooting	Pre	20.91	5.54	0.000	22.83	5.31	0.000
	Post	28.82	5.42		30.83	7.71	
Passing	Pre	65.82	7.57	0.000	63.25	7.36	0.000
	Post	71.09	6.99		74.08	9.05	
Dribbling	Pre	24.26	2.84	0.044	23.63	2.49	0.002
	Post	22.70	2.83		20.91	1.50	

Table 14

Effect of Ball Size on Shooting

	N	Hoop Height (ft.)	Pretest Ball Size	Mean	P	Posttest Mean	P
Male	12	9	6	39.67	0.345	43.42	0.676
	12	9	7	36.67		45.17	
	15	10	6	34.80	0.039	37.73	0.844
	15	10	7	27.87		37.13	
Female	17	9	6	25.18	0.893	32.00	0.837
	18	9	7	24.89		32.44	
	11	10	6	20.91	0.405	28.82	0.480
	12	10	7	22.83		30.83	
Male & Female Combined	29	9	6	31.17	0.524	36.72	0.757
	30	9	7	29.60		37.53	
	26	10	6	28.92	0.190	33.96	0.873
	27	10	7	25.63		34.33	

Table 15

Effect of Ball Size on Dribbling

	Pretest		Posttest	
Ball Size	Mean	P	Mean	P
		Male		
6	19.41		18.49	
		0.294		0.287
7	20.23		19.03	
		Female		
6	23.72		22.21	
		0.232		0.178
7	22.85		21.32	
		Male and Female Combined		
6	22.02		20.38	
		0.993		0.776
7	21.61		20.24	

Table 16

Effect of Ball Size on Passing

	Pretest		Posttest	
Ball Size	Mean	P	Mean	P
		Male		
6	76.74		80.78	
		0.022		0.101
7	70.70		76.33	
		Female		
6	64.39		71.71	
		0.762		0.455
7	63.83		73.40	
		Male and Female Combined		
6	70.45		76.16	
		0.066		0.454
7	67.08		74.79	

Table 17

Effect of Basket Height on Shooting

	Pretest			Posttest		
	Mean			Mean		
Sex	9 ft.	10 ft.	p	9 ft.	10 ft.	p
	Size 6 ball					
Males	39.67	34.80	0.081	43.42	37.73	0.059
Females	25.18	20.91	0.091	32.00	28.82	0.187
Male and Female Combined	31.17	28.92	0.039	36.72	33.96	0.230
	Size 7 ball					
Males	36.67	27.87	0.024	45.17	37.13	0.061
Females	24.89	22.83	0.335	32.44	30.83	0.534
Male and Female Combined	29.60	25.63	0.095	37.53	34.33	0.235
	All Size 6 and 7 balls					
Males	38.17	31.33	0.005	44.29	37.43	0.007
Females	25.03	20.91	0.050	32.23	29.87	0.176
Male and Female Combined	30.38	26.75	0.076	37.14	34.15	0.090

Table 18

Correlated t test Between Pre and Post-tests

Treatment	Number of Cases	Mean Pre	Mean Post	t Value	Level of Significance
1	32	29.6	36.9	6.79	.0001
2	26	25.6	34.9	5.73	.0001
3	25	28.6	32.5	3.97	.001
Control	29	32.5	34.5	1.57	.13

Mastery Learning Strategy, Treatment 1
Whole Learning Strategy, Treatment 2
Progressive-part Learning Strategy, Treatment 3

Table 19

Frequencies of Scores

Scores	Treatment 1 pre	Treatment 1 post	Treatment 2 pre	Treatment 2 post	Treatment 3 pre	Treatment 3 post	Control pre	Control post
40-50	4	18	0	5	3	7	6	8
Mastery Level								
30-39	13	8	9	16	11	14	13	13
20-29	12	3	9	5	7	4	8	8
0-19	3	3	6	0	4	0	2	0

Mastery Learning Strategy, Treatment 1
Whole Learning Strategy, Treatment 2
Progressive-part Learning Strategy, Treatment 3